April.	h.	
1	0	Mercury at greatest distance from the Sun.
2	21	Venus at greatest distance from the Sun.
4	13	Uranus in opposition to the Sun.

Saturn, April 1.—Outer major axis of outer ring = 42″·8; outer minor axis of outer ring = 15″·5 : southern surface visible.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′			h. m.	
U Cephei	0 52·4	81 16 N.	Apr.	2,	4 43	*m*
			,,	7,	4 22	*m*
R Lyncis	6 52·1	55 29 N.	,,	2,		*M*
R Canis Minoris	7 2·5	10 12 N.	,,	5,		*m*
R Canis Majoris	7 14·5	16 12 S.	,,	3,	21 15	*m*
S Canis Minoris	7 26·6	8 33 N.	,,	5,		*m*
R Virginis	12 32·8	7 36 N.	,,	7,		*M*
δ Libræ	14 55·0	8 4 S.	,,	3,	23 22	*m*
U Ophiuchi	17 10·9	1 20 N.	,,	1,	1 35	*m*
			,,	6,	2 11	*m*
X Sagittarii	17 40·5	27 47 S.	,,	1,	4 0	*M*
T Herculis	18 4·9	31 0 N.	,,	1,		*m*
β Lyræ	18 46·0	33 14 N.	,,	6,	0 0	m_2
R Lyræ	18 51·9	43 48 N.	,,	2,		*m*
η Aquilæ	19 46·8	0 43 N.	,,	2,	3 0	*M*
T Capricorni	21 15·8	15 38 S.	,,	4,		*M*
δ Cephei	22 25·0	57 51 N.	,,	3,	1 0	*M*
R Lacertæ	22 38·3	41 47 N.	,,	7,		*M*

M signifies maximum; *m* minimum; m_2 secondary minimum.

Meteor-Showers.

	R.A.	Decl.	
Near ν Virginis	175°	7° N.	Bright; slow.
,, ε Delphini	305	12 N.	Bright; slow.

THE ROYAL METEOROLOGICAL SOCIETYS EXHIBITION.

FOR several years past the Royal Meteorological Society has organized an Exhibition of Meteorological Instruments in connection with its ordinary meeting in March. The first Exhibition, which was held in 1880, was of a general character; the subsequent ones, however, have been devoted to the following special subjects, viz. hygrometers, anemometers, travellers' instruments, thermometers, sunshine recorders and radiation instruments, barometers, and marine meteorological instruments.

The subject selected for this year's Exhibition was atmospheric electricity, including new meteorological instruments. The Exhibition was held in the rooms of the Institution of Civil Engineers, 25 Great George Street, Westminster, from March 20 to 23, and was of a most interesting character. The catalogue embraced 155 exhibits, which were arranged under the following heads:—Electrometers, lightning conductors, lightning protectors for telegraph purposes, objects damaged by lightning, &c.; alleged thunderbolts, new instruments, photographs of flashes of lightning, and photographs, drawings, &c.

The Astronomer-Royal exhibited all the apparatus for atmospheric electricity which was formerly in use at the Royal Observatory, Greenwich. These instruments were mounted so as to show the manner in which they were actually arranged for observation.

The Kew Committee also exhibited a number of electrometers which were employed by Sir Francis Ronalds at the Kew Observatory from 1843 to 1851. These are fully described in the Report of the British Association for 1844. Several forms of Thomson's portable electrometer were also shown. The electricity in this instrument is collected by means of a burning fuse at the extremity of a vertical wire. Prof. F. Exner, of Vienna, sent his portable apparatus for the determination of the normal potential in the open air and while travelling.

Numerous patterns of lightning conductors were exhibited by Messrs. J. W. Gray and Son, Messrs. R. Anderson and Co., Messrs. John Davis and Son, and also by the Lightning Rod Conference. Models of churches, houses, chimney-shafts, &c. showed the systems adopted for securing protection from damage by lightning. Messrs. Siemens, Brothers, and Co., also exhibited their apparatus for testing the efficiency of lightning conductors.

The Postal Telegraph Department showed a number of lightning protectors which are used for protecting telegraph instruments.

The Exhibition contained many objects damaged by lightning, including lightning conductors, telegraph instruments and line wire, and portions of trees struck by lightning. The most interesting exhibit, however, was that showing the clothes of a man torn off his body by lightning on June 8, 1878, while standing under a tree. These comprise a flannel jacket, flannel undervest, trousers, stockings, garters, boots, and watch; also a portion of the bark from the tree.

A valuable collection of meteorites was also shown, the specimens being from various parts of the world, and one showing the Widmanstätten figures. A number of alleged "thunderbolts" were also exhibited. These were of an amusing character; the specimens being in reality nothing more than a large nodule of sandstone, a cannon-ball, a piece of coal, clinkers, &c. Mr. Symons, at the meeting of the Society, showed that these were really of a terrestrial, and not a celestial, nature.

One of the special features of the Exhibition was the very interesting collection of more than fifty photographs of flashes of lightning which have been collected from all parts of the world. These show that lightning does not take the zigzag path as depicted by artists and painters. The lightning really takes a very sinuous and sometimes erratic path. Some of the photographs had been enlarged specially for the Exhibition, and showed up to great advantage. In some cases the photographs showed the lightning to be not merely a line of light, but to have a perceptible breadth, somewhat resembling a piece of tape waved in the air. A large number of the photographs were taken in London during the great thunderstorm of August 17, 1887. One of the photographs taken by Mr. E. S. Shepherd shows the remarkable phenomenon of a *dark* flash.

Mr. Symons exhibited three diagrams of lightning made by Mr. James Nasmyth, F.R.S., in 1856, showing (1) Nature's lightning; (2) painter's lightning; and (3) forked lightning. On comparing these drawings with the photographs of lightning, it is at once apparent what a keen eye Mr. Nasmyth must have had, for the agreement is exceedingly close.

Several new meteorological instruments were exhibited. Mr. W. H. Dines showed a maximum wind pressure anemometer. This has a circular plate, which is always kept face to the wind, at the back of which is a vessel containing shot. The pressure of the wind forces back the plate, and allows shot to fall from the higher to the lower part of the vessel. As soon as the weight of the shot in the lower vessel is equal to the whole pressure on the plate, the plate resumes its normal position, and the opening through which the shot falls is closed. The weight of the shot in the lower vessel gives the maximum pressure since the instrument was last read. Mr. G. H. Larkins showed some rainband spectroscopes with Tripe's arrangement. The improvements in this instrument over the ordinary form of direct-vision spectroscope are: (1) that it gives uniform light and dispersion, and also better definition of the lines; (2) that as the slit is of uniform width, observations made with this form of instrument are comparable with each other; and (3) that the focussing tube can be fixed by a revolving clamp and kept ready for use.

Dr. Marcet exhibited Prof. Colladon's instrument for illustrating the formation of waterspouts. This consists of a large glass vessel, at the bottom of which has been scattered some dust somewhat heavier than the water. The motion given to a handle turns a wheel which imparts to the water a circular motion. The dust is then drawn up from the bottom in a column, and looks exactly like a waterspout or a sand pillar.

Mr. J. B. Jordan showed one of his new pattern photographic sunshine recorders (in which he now obtains a straight record instead of a curved one), and also that devised by Dr. J. Maurer, of the Swiss Central Observatory, Zurich.

Mr. G. M. Whipple exhibited his repeating cloud camera, which has been designed for obtaining a series of four photographs of the same cloud at short intervals of time, in order to show rapid changes of form.

Numerous photographs of damage by lightning were shown, as well as several records of atmospheric electricity taken at the Greenwich and Kew Observatories during thunderstorms and snowstorms. Messrs. Norman May and Co., exhibited two beautiful photographs taken from the top of the Worcestershire Beacon (1390 feet above sea-level), about 700 feet above the general level of the fog which covered the whole of the surrounding country, on January 12 last. Above the fog there was bright sunshine.

© 1888 Nature Publishing Group

Mr. R. Abercromby and Mons. C. Moussette each exhibited some very fine photographs of clouds; and Mr. J. S. Dyason showed a number of sketches of skies in colour.

WILLIAM MARRIOTT.

THE BOTANICAL DEPARTMENT, NORTHERN INDIA.

UP to the year 1874-75, the Botanical Gardens at Saharanpur and the Botanical Officer in charge of them were Imperial, *i.e.* were under the control of the Supreme Government. In 1875, under the scheme of decentralization by which the independent powers of local Governments were considerably increased, the charge of the Saharanpur (Botanical) Institute became provincial, and passed under the authority of the Lieutenant-Governor of the North-Western Provinces and Oudh.

In 1887 the subject of reorganizing the Botanical Survey in India was taken up in connection with the memorandum, dated February 10, 1885, by Mr. Thiselton Dyer, Director of the Royal Gardens, Kew, and after consultation with the Government of the North-Western Provinces and Oudh and the Superintendents of the Botanical Gardens, Howrah and Saharanpur, the Government of India determined that the most important step which it was desirable to take in order to bring the hitherto unexplored regions of India under botanical survey was to expand the circle, for the botanical investigation of which the Saharanpur Officer was responsible, so as to bring the greater part of Upper India within the sphere of his duties. In order to effect this object it became necessary to restore the Saharanpur Botanist to his former position as an Imperial officer. A further reason for this change was found in the necessity for maintaining, at the disposal of the Government of India, the services of a Botanical Officer with a specially trained staff for the purpose of accompanying expeditions in the neighbourhood of or beyond our north-western frontier. These duties have now been attached to Mr. Duthie, the officer who holds the Saharanpur appointment.

The transfer took effect from April 1, 1887. But the Gardens, with the assistant, Mr. Gollan, who was brought out in 1879, were not placed under Imperial control, but still remained provincial. The Imperial Botanist is therefore now divorced from the Curatorship of the Gardens, which has passed, under the general control of the Director of the Provincial Department of Agriculture, into the hands of the former assistant. The Botanical Officer retains his occupation of the house and Botanical Museum (with the Herbarium), but has no longer any connection with the practical management of the surrounding gardens.

The Botanical Officer retains under his control the whole of the native staff connected with the Museum and its Herbarium, as well as the native artist (now drawing Rs. 100 a month), who was trained at the Bombay School of Art specially for the Saharanpur Institution.

THE NEW SIBERIAN ISLANDS.[1]

THE Expedition of MM. Bunge and Toll, who have explored the lower Yana and the islands of New Siberia during the last two years, was sent out by the Russian Academy of Sciences. Hedenstrom's description of the masses of petrified wood which is found on these islands, and the information gathered from the hunters as to the richness of the archipelago in remains of Quaternary mammals, were the chief inducements for sending out the Expedition.[2] The Expedition consisted of Dr. Bunge, who had just terminated his two years' stay at the Sagastyr Polar station at the mouth of the Lena; Baron Toll; two Cossacks, four Yakuts, and two Tunguses. After having explored the region at the mouth of the Yana during the summer of 1885,[3] and spent the winter at the Kazatchie settlement, twenty miles to the south of Ust-Yansk, the Expedition started in the spring for the New Siberian Islands, and for better exploring them divided into two parties. Dr. Bunge undertook the exploration of the southern islands of the archipelago, and especially of the small Lyakhoff Island, while Baron Toll explored the northern islands (Kotelnyi, Thaddeus, and New Siberia), usually called the Anjou Islands.

Owing to some misunderstanding Dr. Bunge did not find his reindeer on the small Lyakhoff Island, which was his chief station; and, until June 14, he was compelled to limit his explorations to a few excursions only. He saw large flocks of ducks coming from the north—that is, from what is an open sea on our maps, while several species of *Larus* and *Totanus* came from the south. As a rule, few birds cross to Little Lyakhoff Island in their migrations; only geese come by the end of June, and as they moult on the shores of the small lakes and ponds of the island, they are killed in great numbers by the hunters.

The winter lasts on the Little Lyakhoff Island until the first part of June, and returns again in October. On October 16 the frost was already −37° C., but even during the summer 10° C. over zero is considered a very hot temperature; and in July there were thirteen days with snow, fifteen with fog, four with rain, and one snowstorm.

And yet organic life develops with astonishing rapidity. The first flowers were seen on June 11, and Dr. Bunge's collection of phanerogams numbers seventy species; but all plants are dwarfs, hardly reaching a few inches, while the soil, even in the best situated places, thaws only to the depth of 16 inches. The water of the small ponds is so much warmed by the rays of the sun, that temperatures of from 10° to 16° C. were observed, and therefore worms and Crustacea rapidly develop in the ponds. The insects are few; even the mosquitoes do not plague men and cattle as they do on the continent; still, two butterflies were caught. As to mammals, herds of reindeer come every year from the continent to the islands, but in smaller numbers than formerly; they are followed by wolves. The snow fox is very common, but the common fox and hare are exceedingly rare visitors to the islands. The Polar bear has become of late very rare, and hunters attribute this to the fact that the ice has remained unbroken for several yeas past. They affirm that the ice around the coasts has not moved since the year when Nordenskiöld sailed through in the *Vega*, and Dr. Bunge doubts whether it will soon be possible to repeat the same journey.

The chief interest of the island is in its masses of fossil bones buried in the frozen soil. Bones of the mammoth, rhinoceros, *Bos moschiferus*, two other species of *Bos*, several species of *Cervus*, very many bones of *Equus*, and several others, were found, and brought in by Dr. Bunge. The rocks of which the island is built are granite and sedimentary rocks without fossils.

Baron Toll's expedition was much richer in results. It appears from his surveys that the Kotelnyi Island extends much farther east than is shown on our maps, and that it is connected with Thaddeus Island by a sandy beach. It would be most interesting to know how far this circumstance is due to the upheaval of the islands, which is sure to go on like the upheaval of all the northern coast of Siberia. But the most important discovery is, that the masses of fossil wood which were found on Thaddeus Island proved to be Tertiary, and not Quaternary, as has hitherto been supposed. They belong to layers of Tertiary coal, and fossil *Sequoiæ* were found amidst them. We have thus a new proof that the great Tertiary continent which possessed a warm climate, well known from Oswald Heer's description, included not only Greenland, Spitzbergen, and Novaya Zemlya, but also the New Siberian Archipelago, more than 90° of longitude to the east of Novaya Zemlya. Geology must explain the existence of this warm climate beyond the 75th degree of latitude, at a period so closely preceding that of the glaciation of the northern hemisphere.

Finally, Baron Toll, after having made rich zoological, botanical, and palæontological collections—Silurian, Devonian, and Triassic deposits being found on the Kotelnyi Island,—reached the northern extremity of the island under the 76th degree of latitude, and thence he saw the land which was seen eighty years ago by Sannikoff, and has since periodically appeared on, and disappeared from, our maps. It exists, and it is situated nearly a hundred miles (150 versts) due north, off the northern extremity of the Kotelnyi Island.

If we take into account the facts that there are serious reasons for admitting the existence of a land to the north of Novaya Zemlya,[1] and that the existence of Sannikoff's Land is now again

---

[1] See the Preliminary Report by A. Bunge in the *Izvestia* of the Russian Geographical Society, vol. xxiii. 1885, 5th fascicule.

[2] See Dr. Schrenck's "Zur Vorgeschichte der von der Akademie ausgerüsteten Expedition," in *Beiträge zur Kenntiss des Russischen Reichs*, 3te Folge, 1886.

[3] The account of the explorations in the Yana region has appeared in the *Beiträge zur Kenntniss des Russischen Reichs*, 1886.

[1] See the "Report of the Commission for an Arctic Expedition" in the *Izvestia* of the Russian Geographical Society, 1871.

© 1888 Nature Publishing Group